PP20 vs PP30

PERFORMANCE		
	V1.1 PP20	**V1.2 PP30**
Continuous Power Rating	15 kW @ 50Hz 18 kW @ 60Hz	25 kW @ 50/60 Hz
Sound Level @ 7 meters	85 dB	85 dB
Biomass Consumption	1.2 kg/kWh (dry biomass)	1.0 kg/kWh (dry biomass)
Runtime per hopper fill: Approximate @ 250kg/m^3 feedstock density	5 kW: 10 hours 10 kW: 5 hours 15 kW: 3 hours	5 kW: 12 hours 10 kW: 6 hours 15 kW: 4 hours 25 kW: 2.4 hours
Max. continuous operation	>12 hours	>12 hours
Start up time:	10–20 minutes	10–15 minutes

OPERATING CONDITIONS		
	V1.1 PP20	**V1.2 PP30**
Ambient Temperature	5–40˚C, 40–100˚F	5–40˚C, 40–100˚F
Ambient Relative Humidity	5–95%	5–95%
Installed Footprint L x W x H	1.36 × 1.35m 53.5 × 53.5 x 88in	1.778 × 1.42 × 2.24m 70 × 56 × 88 in
Site Requirements	Well ventilated, level floor, protected from rain and direct sun, 1.75m overhead clearance, fireproof hood over the flare.	Well ventilated, level floor, protected from rain and direct sun, 1.75m overhead clearance, fireproof hood over the flare.

FEEDSTOCK BIOMASS		
	V1.1 PP20	**V1.2 PP30**
Size	1–4cm / 0.5–1.5 in	1–4cm / 0.5–1.5 in

Moisture content	10–30% dry basis	10–30% dry basis
Approved and tested w/ normal operating procedures	Softwood Chips (e.g. Fir, Pine) Hardwood Chips (e.g. Oak, Ash) Nut Shells (Walnut, Hazel Nut, Macadamia)	Softwood Chips (e.g. Fir, Pine) Hardwood Chips (e.g. Oak, Ash) Nut shells (Walnut, Hazel Nut, Macadamia)
Approved and tested w/ increased operating effort	Coconut Shells, Corn Cobs	Coconut Shells, Corn Cobs
Not approved Dangerous to equipment; voids warranty	Coal, Tires, Plastic, Municipal Solid Waste, Manure, Grass Clippings, Rice Husk, Peanut Shells, Almond Husks	Coal, Tires, Plastic, Municipal Solid Waste, Manure, Grass Clippings, Rice Husk, Peanut Shells, Almond Husks

SHIPPING			
		V1.1 PP20	**V1.2 PP30**
Dimensions:	Main crate	1.45 × 1.45 × 1.40 m 57 × 57 × 54 inches	1.83 x 1.47 x 1.40 m 72 × 58 × 55 inches
	Hopper crate	83 × 83 × 114 cm 33 × 33 × 45 inches	83 × 83 × 114 cm 33 × 33 × 45 inches
Weight	Main crate	700kg 1,750 lbs	1,130 kg 2,500 lbs
	Hopper crate	91kg 200lbs	91kg 200lbs

FUEL COST COMPARISON (Varies by Region)	
FUEL	PRICE RANGE
Diesel / LPG	$0.25–0.75/kWh
Gasoline	$0.25–0.75/kWh
Biomass	**$0.00–0.08/kWh**

GASIFIER		
	V1.1 PP20	**V1.2 PP30**
Type	APL v5 Patented Multistage heat recycling downdraft gasifier	APL v5 Patented Multistage heat recycling downdraft gasifier
Materials	304 Stainless, 310 Stainless, 321 Stainless, Mild Steel	304 Stainless, 310 Stainless, 321 Stainless, 316 Stainless, Mild Steel
Hearth	Coated Ceramic	Coated Ceramic
Char-Ash Removal	Automated removal from reactor to 12-hour batch vessel.	Automated removal from reactor to 12-hour batch vessel.
Fuel Feed	Automated from hopper to reactor	Automated from hopper to reactor
Hopper Capacity	333 liters / 88 gallons	333 liters / 88 gallons
Hopper Filling	Batch—manual refilling while operating. (Optional continuous feed hopper system automates filling.)	Batch—manual refilling while operating. (Optional continuous feed hopper system automates filling.)
Minimum maintenance cycle	~12 hours	~12 hours
Control system	On-board automation	On-board automation

ENGINE		
	V1.1 PP20	**V1.2 PP30**
Type	GM Vortec	Ashok Leyland
Cylinder count	4	4
Displacement	3.0 liter	4 liter
Compression Ratio	8.2:1, 10.5:1	17:1
RPM	1500 @ 50hz, 1800 @ 60Hz	1500 @ 50hz, 1800 @ 60Hz
Valve Configuration	Overhead valves, Pushrods	Overhead valves, Pushrods

Engine block / Cylinder head	Cast Iron w/ hardened exhaust valve inserts	Cast Iron w/ hardened exhaust valve inserts
Ignition	Mechanical distributor	Coil over plug (COP)
Oil capacity	5 quarts (including filter)	8L 15W-40
Oil Maintenance Interval	250 hrs	500 hrs
Coolant capacity	11.4 liter / 12 quarts (CHP module increases capacity)	15L
Auto-shutdown	Low oil pressure High coolant temperature	Low oil pressure High coolant temperature
Starter	Reduction Gear PG260L	12V Starter (TBD)
Charging system	Delco-Remy 7-SI (70A)	AC Charger
System voltage	12V DC	12V DC
Recommended battery	75Ah, 880 CCA Marine	75Ah, 880 CCA Marine
Battery tray dimensions	20 × 30 cm / 10 × 12 inches	20 × 30 cm / 10 × 12 inches
Speed control	Electronic governor Woodward L-series	Electronic governor Woodward L-series
Mixture control	Automated with Wide Band Oxygen Sensor	Automated with Wide Band Oxygen Sensor

GENERATOR		
	V1.1 PP20	**V1.2 PP30**
Type	Mecc Alte NPE32-E/4 12 wire reconfigurable	Mecc-Alte ECP32 2S4B 12 wire reconfigurable
AVR	Mecc Alte DSR	Mecc Alte DSR
Available Voltages	120-277, 240-480 V AC	120-277, 240-480V AC
Available Topologies	3 phase: Series Star, Parallel Star, Series Delta, Parallel Delta, 1 phase: Double Delta (Base Model)	3 phase: Series Star, Parallel Star, Series Delta, Parallel Delta, 1 phase: Double Delta (Base Model)

Total Harmonic Distortion	<5%	<5%
Motor Surge Starting Capacity	>300%	>300%
Genset Starting	Manual Handover	Manual Handover
Maximum step-load	50% of rated power	50% of rated power

HEAT EXCHANGER	
Type	Brazed Plate
Material	316T Stainless Steel, pure copper brazing
Flow Capacity	14m^3/hr (60 GPM)
Maximum Pressure	3.0 Mpa (435 psi)
Design Temperature	−160˚C to 225˚C (−256˚F to 437˚F)

PERFORMANCE	
Maximum Outlet Temperature	90˚C (190˚F)
Return Temperature Range	40–90˚C (160–190˚F)
Standard Temperature Difference	14˚C (57˚F)
Heating Water Volume Flow	1.5m^3/hr (6.5 GPM)
Maximum Operating Pressure	1.0 Mpa (145 PSI)
Pressure Loss	45 mbar (18 in H_2O)

TECHNICAL SPECIFICATIONS	
Electrical + thermal efficiency	~35%
Max CHP system output	~20kW thermal at 15kW electrical load 70,000 BTU-h
Working Fluid Flow rate Target inlet temperature	Coolant: 50/50 of Water/Ethylene Glycol 3.9m^3/hr (17.17 GPM) 60˚C (140˚F)

Target outlet temperature Max temperature rise	74˚C (165˚F) 25˚F Δ
Plumbing Connection	1 inch NPT
Shipping weight	120kg (260 lbs)
Potable water	No

USE CASE EXAMPLES	
INDUSTRY	USE
Residential / Commercial	Radiant hydronic heating Water-to-air heating Pool and spa heating Snow melt Adsorptive chilling
Animal Husbandry	Barn and enclosure heating Sterilization and cleaning
Agriculture	Greenhouse heating Food/Seed drying Process heat
Forestry	Kiln-drying lumber Pulp drying Space heating
Manufacturing	Heat for chemical processes Food processing Fluid transport Textiles Minerals

Specifications subject to change without notice